Supercrete™

Sustainable Cost Effective Construction & Coating Systems

Block Construction Brochure

Sound Insulation • Quality
Thermal Insulation • Fire Resistant

8 YEARS

NEW ZEALAND MADE

Supercoat™

100% NZ
Owned & Operated

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Supercrete™ Block Construction

What is Supercrete™ Block Construction?

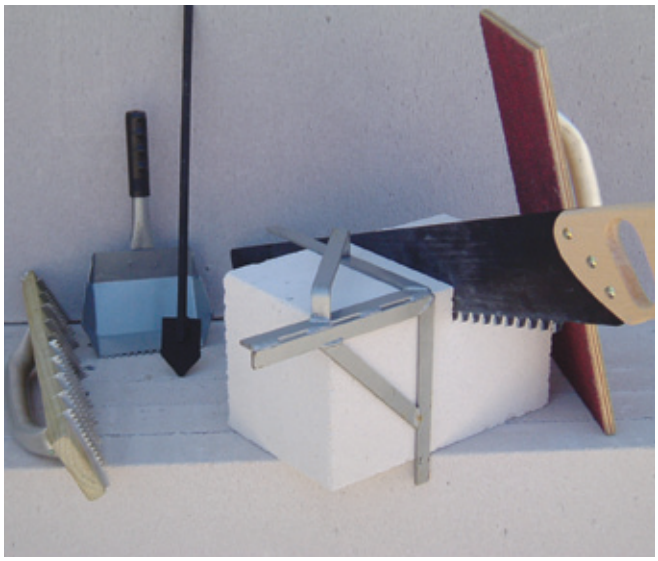
Supercrete™ Blocks are manufactured from Autoclaved Aerated Concrete (AAC). This is made from lime, sand and cement, to which a frothing agent is added to aerate the concrete. The partially cured concrete is then autoclaved to complete the curing and to promote the formation of a crystalline structure. The aeration and low density (approximately one quarter of the density of standard reinforced concrete) enables blocks to be easily cut, drilled and shaped by hand. Blocks are glued together to form solid masonry structural walls with excellent thermal and acoustic properties.

Benefits

- The block construction system is very simple yet allows complete design flexibility for basic or complex designs and architectural features.
- Construction can be undertaken by anyone familiar with standard construction methods and does not have to be undertaken by block or bricklayers.
- Solid wall construction gives a quality and feel to a building that is normally associated only with elite homes at the top end of the market.
- Independent cost comparisons show that Supercrete™ Block is very cost efficient and affordable, compared with other solid masonry systems.
- Supercrete™ Block does not rot or decay over time, does not support the growth of fungus or mould, and does not harbour rodents or insects.
- Block construction has all the inherent thermal, acoustic and fire resistant benefits of AAC. All walls 150mm thick or more have a 4 hour fire rating, the highest rating possible.
- Supercrete™ Block construction can be complemented with Supercrete™ Floor Panels and wall panels.
- As blocks are glued together, they form homogeneous panels with uniform thermal and acoustic properties over the whole wall surface.
- The low density of Supercrete™ Block gives a high strength to weight ratio, with a reduced bracing demand. Supercrete™ Block buildings have performed well under actual earthquake conditions.
- Supercrete™ Block can be used for internal and external walls, load-bearing walls and for multi-storey construction.

Components

- Supercrete™ Blocks for structural purposes are available in a full range of thicknesses from 150mm, through to 300mm. All blocks are solid unreinforced AAC with an approximate dry density of 525 kg/m^3 (approximately the same as Douglas Fir timber) and are 600mm long by 250mm high. Blocks are dimensionally very accurate as they are cut to size when partially cured.
- Supercoat™ AAC Superbond Adhesive is a modified cement mortar supplied in dry powder form in 25 kg bags. It is applied to joints in a 2 - 3mm thickness.
- Vertical reinforcing rods are installed into drilled holes in the blocks at nominal 1.0 metre centres.
- Supercoat™ Coating Systems have been specifically formulated for application over Supercrete™ Blocks. For a full range of Coating System options please see the Supercoat™ AAC Coating Systems Technical Manual located at www.supercoat.co.nz.
- Hand tools are available for use with the Supercrete™ Block including notched trowels, drill bits, sanding floats and saws.
- Fasteners are specially designed for use in Supercrete™ Blocks and are available from Supercrete™ distributor For best results knotted plastic plug or epoxy grout anchors are recommended.



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Design Considerations

Foundation design should be in accordance with NZS 4229 for full masonry design. Typical footing details for block walls are shown in Detail 1.

The minimum recommended thickness of walls is 200mm for external and 150mm for internal load bearing walls.

As with all solid masonry construction, it is advisable to align walls on upper floors with those on lower floors, to avoid the requirement for support beams.

Bracing capacity of walls should be calculated using the bracing tables in the Supercrete™ Block Design Guide. Vertical reinforcing in these tables is at nominal 1000mm centres and the top of all walls on each level should have a bond beam constructed with 2 x D12 rods minimum. Bond beam construction is shown in Detail 2. Where this supports a floor, refer Supercrete™ Structural Floor Panel detailing.

Vertical movement control joints are required in all walls at a maximum of 6000mm spacing. See Detail 3 showing control joint construction. Vertical control joints should also be aligned with floor slab joints, changes in foundation supports or wall heights, and at likely stress raiser points in the floor shape. The location of control joints should be established prior to calculating bracing capacity of the building. Note that if it is intended to only construct the exterior walls using Supercrete™ Block, it is usually advisable to include some internal block walls to increase the bracing capacity.

Supercrete™ Block is much more dimensionally stable than timber or poured concrete with varying temperature or moisture content. Wherever Supercrete™ Block is to be installed adjacent to different materials, provision should be made for incorporating a slip joint to enable relative movement between the dissimilar materials.

Construction plans should detail the location of vertical rods and the location of movement control joints.

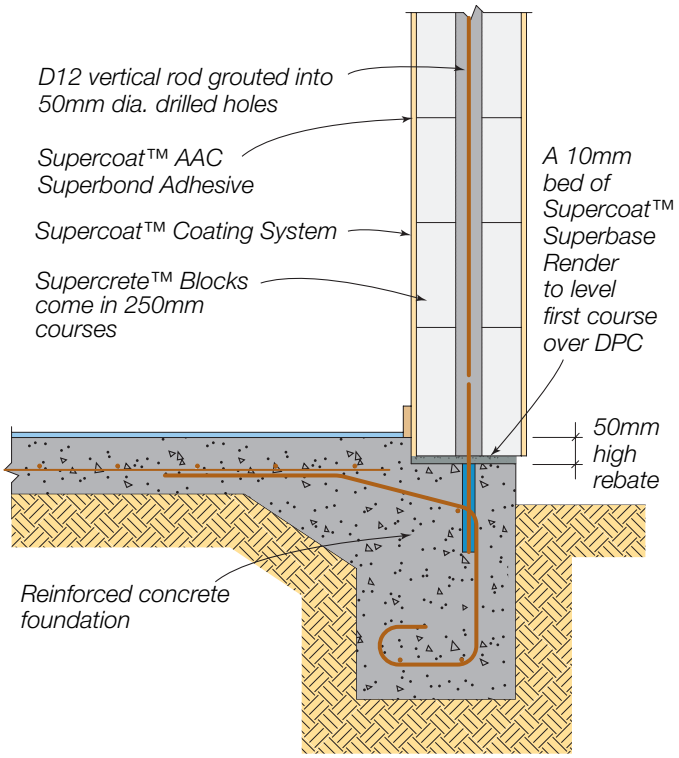
Ordering, Delivery and Storage

Your local Supercrete™ Distributor will provide a full schedule of quantities of all components required for the Supercrete™ Block part of a building. There is a lead-time of approximately 6 - 8 weeks required from time of order to delivery on site.

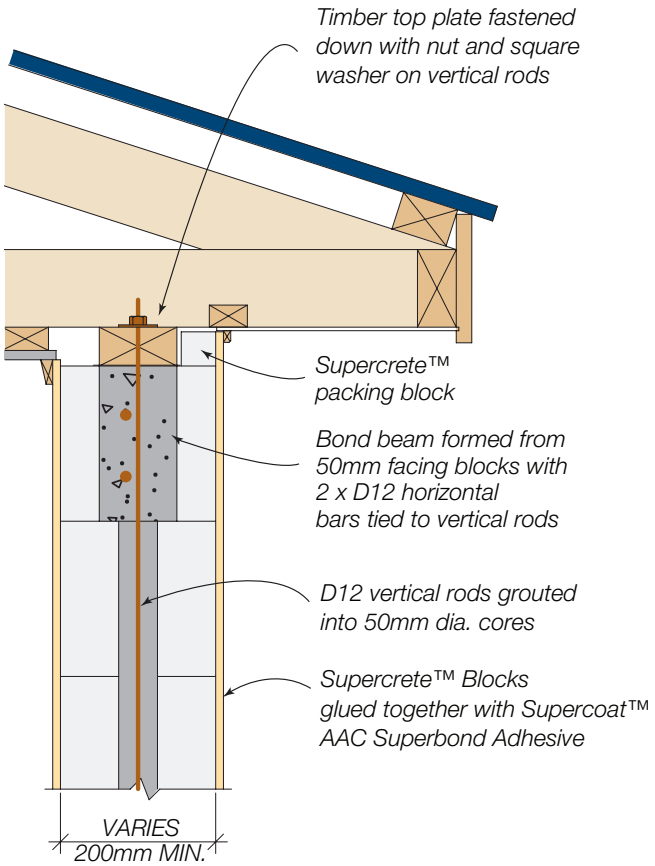
Supercrete™ Block is supplied plastic wrapped on pallets and should be kept as dry as possible prior to laying. It is advisable to place these pallets as close as practical to the areas where the block is to be used for faster construction and reduced labour. Floor slabs should be cured for a minimum of 7 days before placing pallets directly on them.

All products must be stored in a well ventilated area, kept dry, out of direct sunlight, away from freezing conditions and up off concrete floors. The acrylic products, in the original unopened containers, have a shelf life of 2 years from date of manufacture, or 12 months once opened. The dry bagged products, in the original unopened bags, have a shelf life of 6 months from date of manufacture.

Detail 1. Typical Foundation Detail



Detail 2. Typical Bond Beam Detail



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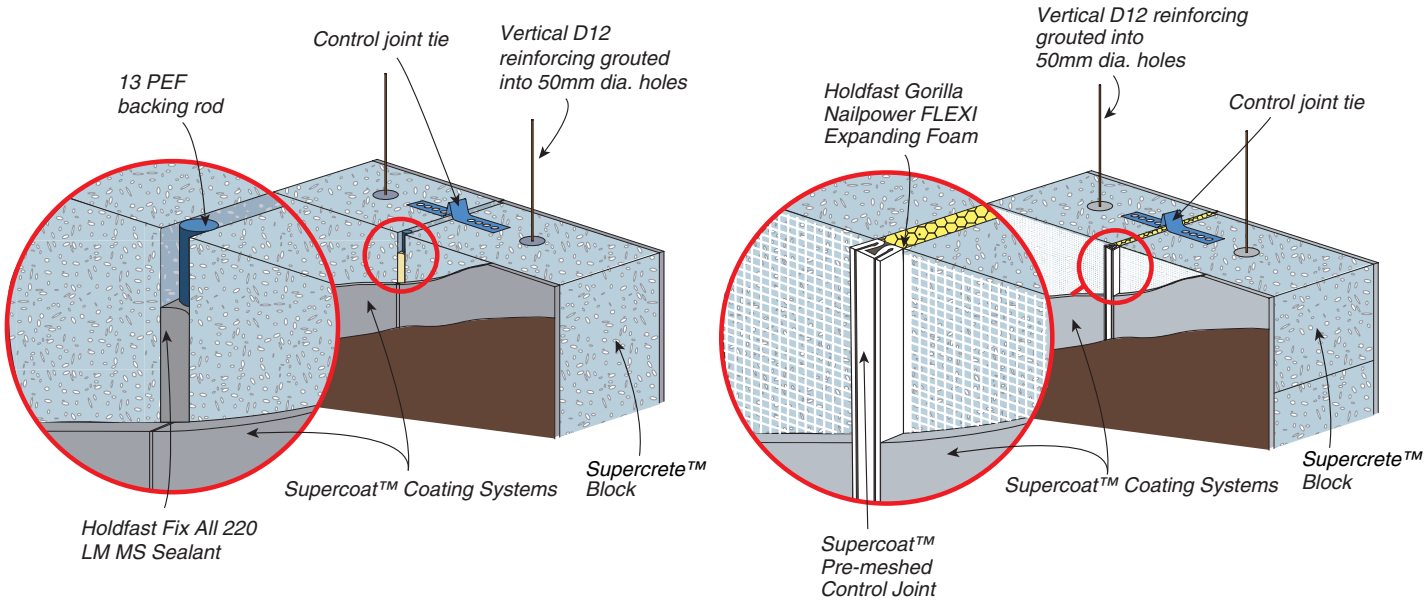
Detail 3. Movement Control Joint Details



Construction

Overall wall construction is shown in Detail 6. Holes are drilled in the foundation rebate for the rods & plugged to prevent dirty entering while the blocks are laid.

A layer of DPC is laid along the rebate to provide a slip joint for the Supercrete™ Block/concrete interface.

A nominal 10mm layer of its mortar is trowelled over the DPC and the first course blocks is placed and levelled to stringlines, beginning at corners. Cut-outs for access when grouting the rods into the foundation are drilled and cut from blocks as laying proceeds.

Blocks can be cut using a handsaw or a band saw. Extra care should be exercised laying the first course to provide a good level base for subsequent courses. Blocks are drilled with a 50mm core for the vertical rods to be inserted. The blocks are glued using Supercoat™ AAC Superbond Adhesive and are overlapped with a minimum of 100mm. The surface of each course should be brushed off to remove all dust before adhesive is applied and the surface of blocks should be kept dry. All excess adhesive should be smoothed off on both sides of the wall before it goes hard.

Once the top block course under the bond beam has been reached, the D12 vertical rods are dropped down the drilled holes epoxy grouted into the holes in the foundation. Access cutouts are glued back in place, and the vertical cores are then grouted with 17MPa grout.

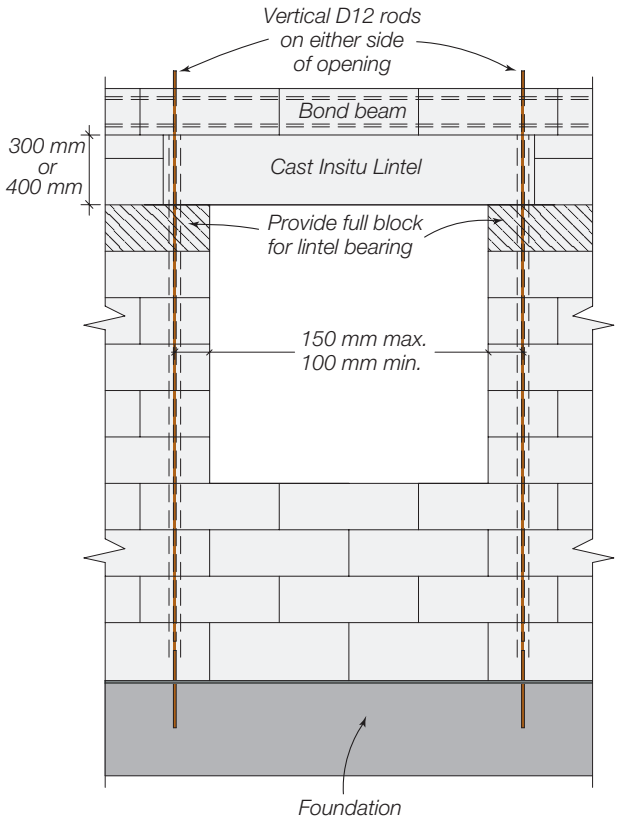
Tying two D12 horizontal bars to the protruding vertical D12 rods then forms the bond beam, with 50mm facing blocks glued to each side as permanent formwork with 17MPa concrete poured between them.

Laying of blocks should not be carried out if there is a danger that the temperature will drop below 5° during the entire curing process.

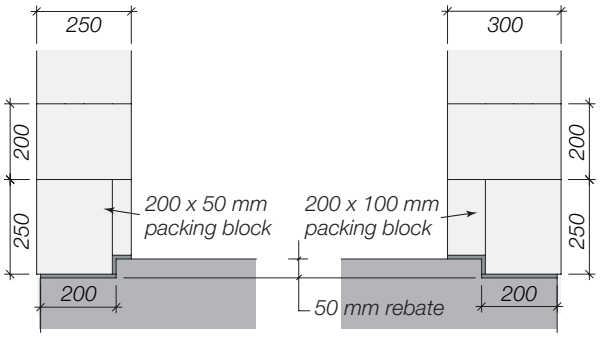
Cast insitu, lintels are constructed in the same manner as the bond beams, and are often formed by deepening of the bond beam over the opening, but with the addition of extra tension steel and shear reinforcement.

Surfaces of walls should be sanded down flush with a sanding float and excess dust removed, prior to applying the surface finish.

Detail 4. Typical Lintel Detail



Detail 5. First Course Detail for Varying Wall Thickness



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Installation of Services

Supercrete™ Block construction allows for quick and efficient installation of services such as wiring and plumbing in any location on a wall. Chases no deeper than 1/3 of the wall thickness are cut into the wall using either hand or electric routers, or saw cuts. All wiring should be encased in conduit and after embedment in the wall, the chases are filled with Supercoat™ Superbond AAC Adhesive.

Supercoat™ Coating Systems

The surface of the Supercrete™ Block should be coated for weathertightness, this will also provide a more impact resistant surface.

For a full range of Coating System options please see the Supercoat™ AAC Coating Systems Technical Manual located at www.supercoat.co.nz.

Technical Support

Superbuild International Ltd and its National Distribution Network do not design Supercrete™ Block structures, as the design principles are no different to other solid masonry design. However, design information and technical support is freely available at both design and construction phases. On-site training is also available if required, to ensure that tradesmen are fully conversant with the construction method.

Thermal Performance

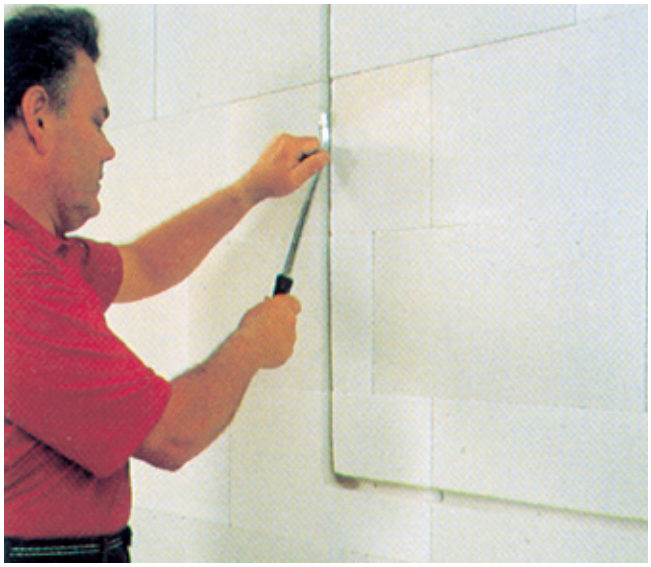
Supercrete™ Blocks have excellent thermal insulation properties due to their cellular structure with entrained air spaces. This means that supplementary insulation is unnecessary in most cases. Compared with traditional building materials, a Supercrete™ Block house will be much warmer in winter, and much cooler in summer. The New Zealand Building Code specifies a minimum R-value for solid masonry construction of between R 0.8 - R 1.2 depending on the Climate Zone within New Zealand (these values are lower than those required for timber framed construction as Masonry walls are homogeneous). A typical 200mm rendered Supercrete™ Block wall has an R-value of 1.66, which is well in excess of code requirements.

The thermal properties of different wall thicknesses are shown in Table 1.

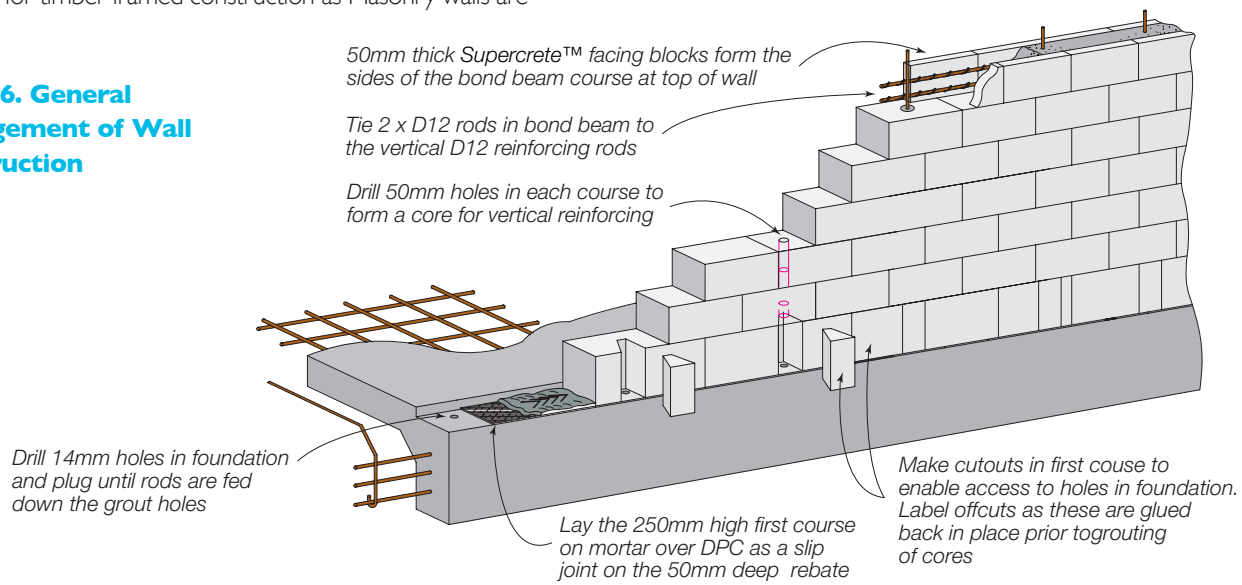
Acoustic Performance

Supercrete™ Block has very good acoustic properties and can significantly reduce the outside noise entering a building, and also room to room noise transmission. AAC has been shown to provide better insulation to sound transmitted by air, than other building materials such as concrete and clay bricks. The sound insulation of a material is primarily dependant on its weight per unit area, but AAC has shown higher than expected sound transmission losses which can be attributed to the internal material dampening i.e. AAC converts more acoustic energy into thermal energy than other building materials, due to its cellular structure.

The Sound Transmission Class for different wall thicknesses is shown in Table 1. Note that a typical timber framed insulated NZ house will have a STC rating of 20 to 24 decibels. Supercrete™ Blocks stop twice as much noise.



Detail 6. General Arrangement of Wall Construction



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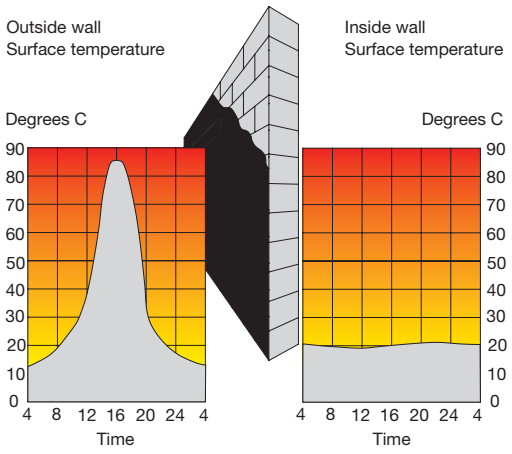
Autoclaved Aerated Concrete Wall Surface Temperatures

The effectiveness of AAC Block in controlling internal room temperatures was illustrated in tests by the Fraunhofer Institute for Architectural Physics in Germany. Surface temperatures were measured over a 24-hour period on a 250mm thick AAC wall. The exterior of the wall was painted black to raise its surface temperature, which varied through a range of 70°C. The inside wall temperature remained at a comfortable 20°C with only a 2° variation. Test results are shown in the graph.



250mm thick AAC block wall
painted black on exterior face

Table 1. Thermal and Acoustic Properties

Block Thickness	Block Only		Render on both sides		Render on one side and 10mm plasterboard on one side	
mm	R value m2k/W	STC rating decibels	R value m2k/W	STC rating decibels	R value m2k/W	STC rating decibels
150	1.07	43	1.39	46	1.29	46
200	1.43	42	1.75	46	1.65	46
250	1.79	45	2.11	48	2.01	48
300	2.15	49	2.47	50	2.37	50

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Authorised Distributor

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